# The Effect of Class Mode on the Relationship Between Academic Self-Efficacy and Class Performance

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## Abstract

Online classes have become increasingly popular in recent years with 29.7 percent of college students taking online classes currently. As a result, educational research has focused on differences between online and traditional (in-person) classes and performance in said classes. This study focused on academic self-efficacy, how it relates to class performance, and how that differs depending on three class modes (online, in-person/traditional, hybrid). The final grades of students in three class sections of an Introduction Psychology course were compared. Results did not indicate that final points varied significantly between the different class sections. Additional analyses looked at the academic self-efficacy measures used. The literature emphasizes that self-efficacy is best measured when content-specific. Thus, the reliabilities of a longer and shorter version of an academic self-efficacy scale were compared. Reliability was not lost (and actually improved) in the shorter version.

# The Effect of Class Mode on the Relationship Between Academic Self-Efficacy and Class Performance

Today, approximately 29.7 percent of college students take at least one distance (online) course. Of those, 15.4 percent take both distance and non-distance classes, while the remaining 14.3 percent take classes exclusively online. While the overall number of students studying on campus for their post-secondary education is decreasing, the rate of students enrolled in online courses has increased steadily every year for public institutions (Allen & Seaman, 2017). There are several benefits to online learning versus traditional in-class learning that may explain this trend, such as greater flexibility, employer incentives to obtain a higher degree, and now an increased prestige of online programs. Because of this increased popularity of online classes, there is a greater need to develop better programs and maximize the benefits of an online learning platform (*2017 Online Education Trends Report*). Past research has found that the success of students can differ depending on how a class is taught. According to Ashby, Sadera, and McNary (2011), these differences change depending on attrition rates, but there is a difference between online, traditional (i.e., face-to-face), and blended (i.e., hybrid) class modes. Past studies focused on the class attributes that affect student outcomes, or on the individual characteristics of a student that impact their success. This study focused on how student characteristics affect their learning success in various class modes.

Online learning requires more responsibility from the students because they may need to manage watching lectures, reviewing material, or taking tests/quizzes. Self-regulated students tend to take better control of their learning (Kauffman, 2015). In self-regulated learning classes, motivation is an important trait needed to improve course outcomes and promote more effective learning (Artino, 2009). As stated by Kauffman (2015),

> "The quintessential academically successful online student can be described as self-motivated, self-directed, exhibiting an internal locus of control with above average executive functioning, communication, interaction and technological skills" (p. 2).

Similarly, Kerr, Rynearson, and Kerr (2006) concluded that the best predictors of individual online learning success are good reading/writing skills, being independent learners, motivation, and having proficient computer literacy. Academic skills (reading and writing) were the best predictors of end-of-course grades, despite the course mode. In addition, Berenson, Boyles, and Weaver (2008) found that emotional intelligence is a strong predictor of student success in online courses. Students with a higher emotional intelligence tend to perform better in an online learning environment.

Another characteristic found to be closely related to academic success is self-efficacy. Self-efficacy is a term first coined by Bandura and is defined as an individual's beliefs about their ability to perform certain tasks or reach specific goals (Bandura, 1995). It is context-dependent, meaning someone will have a different perception of their ability to cook versus their ability to solve math problems. As a result, when studying self-efficacy, it should be addressed in terms of specific behaviors (Bandura, 1977; Bandura, 1995; Bandura, 2006). For this study, academic self-efficacy will be the focus. "Perceived academic self-efficacy is defined as personal judgments of one's capabilities to organize and execute courses of action to attain designated types of educational performances" (Bandura, 1995, p.203). It is important to note that self-efficacy is not an individual's ability, it is one's perception of their ability (Bandura, 1995). So, when students are judging their self-efficacy for learning, they need to consider what will be required of them and how well they can use their previous knowledge and skills to produce new learning (Schunk, 1989).

Self-efficacy has been found to have a number of impacts on academic performance—which is defined by three domains: cognitive skills, course performance, and standardized testing—both directly and indirectly (Bandura, 1995; Chemers, Hu, & Garcia, 2001; Schunk, 1991). As mentioned earlier, emotionally intelligent students performed better in online courses. According to Berenson et al. (2008), "The persistence of emotionally intelligent individuals is attributed to an internal locus of control and self-efficacy, as well as resilience" (p.12). Moreover, self-efficacy can increase engagement which impacts academic accomplishments (Bandura, 1995). Self-efficacy influences level of effort, persistence, and the choice of activities in which an individual chooses to participate (Bandura, 1977). However, the effect on academic persistence should be taken with a grain of salt because often students are partially motivated by teachers rather than being fully self-motivated (Schunk, 1991). Academic self-efficacy also increases a student's motivation to study and work on class material which improves class performance (Robbins et al., 2004). Similarly, Artino (2009) found that self-efficacy is a strong predictor of course satisfaction and continuing motivation to study said material. It also is related to students' grade goals, which were good predictors of final grades. In summary, students' self-efficacy beliefs have a large effect on the motivation and self-regulation of students (through the goals they set; Zimmerman, Bandura, & Martinez-Pons, 1992).

In a study conducted by Sagone and De Caroli (2013), those who had more academic self-efficacy (and more confidence in their academic performance) felt they had more control over their lives and their course performance. Increased self-efficacy leads to students seeing school as a challenge rather than a threat, which increases expectations for academic performances and allows students to be more optimistic about academic outcomes (Chemers et al., 2001). Students with higher self-efficacy in math and verbal contexts put forth more effort to

regulate their learning (i.e., taking control of their learning by studying or asking for help; Zimmerman & Martinez-Pons, 1990). Multon, Brown, and Lent (1991) studied the effect of self-efficacy across various student samples, designs, and criterion measures and in each scenario self-efficacy accounted for at least some variance in students' academic performance and persistence.

Self-efficacy affects academic performance by promoting favorable student characteristics, but other studies have found that having a high academic self-efficacy can have a direct impact on performance. When Chemers, Hu, and Garcia (2001) controlled for high school GPA—taking away the effect of previous academic success—they still found self-efficacy was associated with increased academic performance (Chemers et al., 2001). They concluded that "the level of self-efficacy that the students reported during the first year of university life is a powerful predictor of expectations and performance" (p.62). Zimmerman et al. (1992) also found a moderate relationship between academic self-efficacy and final grades.

All these previous studies focused on academic self-efficacy and the performance of students in traditional classroom settings. There have been few studies focused on the impact of self-efficacy in online-learning scenarios; and those that do looked at technology self-efficacy rather than academic self-efficacy. This is most likely due to the consistent conclusion that self-efficacy is domain specific (Bandura, 1995; Joo, Bong, & Choi, 2000; Wang, Shannon, & Ross, 2013). Wang et al. (2013) used part of their Modified Motivational Strategies for Learning Questionnaire (Modified MSLQ) to study technology self-efficacy and course grades. They found that students with higher technology self-efficacy had higher course grades. Furthermore, the more motivated students were, the more technology self-efficacy they had. Wang et al. (2013) also determined that with higher technology self-efficacy, students have more confidence

in general computer skills as well as in using online learning platforms, and students who had experience in online classes had higher technology self-efficacy.

On the other hand, DeTure (2004) found that technology self-efficacy is not related to final course grades. Kauffman (2015) and Puzziferro (2008) also concluded that online technology self-efficacy is not related to final grades or course satisfaction. Lastly, Taipjutorus, Hansen, and Brown (2012) found a moderate correlation between learner control (the level of control students have over the pace, method, and sequence of their learning) and self-efficacy and advocated for adding more control in online learning platforms to increase academic self-efficacy and improve academic performance. As mentioned earlier, Kerr et al. (2006) found that academic skills were the best predictors of online learning success, which suggests that academic self-efficacy may be a better predictor of final course grades than online technology self-efficacy in an online context. That is why this study focused on academic self-efficacy.

The goal of the current study was to fill the gap in research looking at the differing effect of academic self-efficacy on traditional (i.e., face-to-face), online, and blended (i.e., hybrid) class modes. Means et al. (2010) conducted a meta-analysis of online learning research and warned that past studies on differences between these class modes had a few limitations:

> "An important issue to keep in mind in reviewing these findings is that many studies did not attempt to equate (a) all the curriculum materials, (b) aspects of pedagogy and (c) learning time in the treatment and control conditions. Indeed, some authors asserted that it would be impossible to have done so. Hence, the observed advantage for blended learning conditions is not necessarily rooted in the media used per se and may reflect differences in content, pedagogy and learning time" (p. xv).

This study attempted to resolve these issues by comparing students' final grades from an undergraduate Introduction to Psychology course that teaches the same curriculum in each of these modes. The main purpose of this study was to answer the question: Does learning mode moderate the association between academic self-efficacy and performance? I looked at whether final grades and the effect of academic self-efficacy differed between these modes (traditional, online, and hybrid). The primary hypothesis was that academic self-efficacy would predict final grades and that it would predict differentially depending on which mode the class was taken.

There are additional findings that were considered for this study. These were not the study's primary concern but were addressed in the analysis and discussion. First, efficacy is affected by past performance accomplishments. The degree of effect will depend on how a subject appraises past events. Successes generally increase self-efficacy, but past failures can decrease self-efficacy and more so if the failures come early. People can overcome failures depending on timing and context, it is just contingent on how subjects attribute past successes/failures. If they attribute success to effort, self-efficacy increases; if they attribute success to ability, self-efficacy decreases (Bandura, 1977). Similarly, Joo et al. (2000) concluded that success in previous coursework relates strongly to current self-efficacy. Overall, self-efficacy increases with an increased aptitude and more prior experience (Schunk, 1991). In Zimmerman and Martinez-Pons's (1990) study, the level of efficacy increased with grade level (from elementary to high school), which is most likely due to the increase of knowledge. In an interesting study conducted by Gore Jr. (2006), college self-efficacy scores did not account for much variance in GPA. However, scores taken at the end of the semester were better predictors of GPA compared to scores taken at the beginning of the semester. At the end of the semester, correlations improved even after accounting for past knowledge (i.e., ACT scores; Gore Jr.,

2006). Due to these findings, the current study measured academic self-efficacy at the beginning and end of the semester. My hypothesis was that academic self-efficacy would predict final grades better when measured near the time performance measures were taken; in this case, at the end of the semester.

Secondly, self-efficacy is a better predictor when the measure closely follows the criterion measure, as noted previously (Multon et al., 1991). Again, and this cannot be stressed enough, self-efficacy changes depending on the context in which it is assessed. Test scores correlate higher with academic self-efficacy than internet self-efficacy, but computer performance was strongly related to internet self-efficacy. So, students' perceptions of how they can manage a specific aspect of the learning process are important to performance (Joo et al., 2000). Thus, the questionnaires developed to measure self-efficacy should reflect the behaviors relevant to the construct of interest. If the items are targeting the relevant behaviors then a questionnaire with a few quality items could be just as reliable (or even more so) than a longer questionnaire with less-focused items (Bandura, 2006). Two different versions of an academic self-efficacy questionnaire were used (one longer and one shorter) and I investigated whether any reliability was lost when using the shorter questionnaire. My hypothesis was that reliability would stay consistent even when a shorter form of the academic self-efficacy measure was used to measure self-efficacy.

## Method

### Participants

Participants were students enrolled in a fall semester undergraduate Introduction to Psychology course taught at a public university. At the end of the semester, 1,152 students

remained. Grade levels ranged from non-degree (high school students) to graduate/master's students. The distribution of grade levels was as follows: 4.1% non-degree, 51.2% freshmen, 27.6% sophomores, 10.8% juniors, 6.2% seniors, 0.3% graduate/master's. Students had the choice to enroll in one of three sections of the course. The in-person section held 641 students, 318 students enrolled in the hybrid section, and 193 students enrolled in the online section.

**Materials**

Each section of the Introduction to Psychology course followed the same curriculum which addressed all of the following units: history of psychology, scientific thinking/method, research methods, sensation and perception, the biological basis of behavior, consciousness, memory, cognition, development, learning, emotion, personality, attachment, evolution, intelligence, stress and health, psychology in the workplace, abnormal/treatment, and social/cultural topics.

This researcher developed two questionnaires to measure academic self-efficacy. In both surveys, students had to rank their level of agreement to a statement about themselves on a 7-point rating-scale from "very untrue" to "very true". The first survey (see Appendix A) contained 16 items. Eight items were pulled from Chemers et al. (2001) and measured student's ability to perform the right skills to do well at college academically. The last eight items came from Wang et al.'s (2013) self-efficacy section of the Modified Motivation Strategies for Learning Questionnaire (MSLQ). These items focused on the students' ability to succeed in this specific class. The second survey contained only eight items (see Appendix B). These eight items were the same ones taken from Wang et al.'s (2013) Modified MSLQ. These items were chosen because the self-efficacy section of the Modified MSLQ focused more on performance in a specific class and my criterion measure was final points in the class.

## Procedure

Students had the choice to enroll in one of three course sections: in-person, online, or hybrid. Each section used the same curriculum and administered the same assignments and tests. Each section had access to the same online lectures, though the in-person class got to see the lectures live. The only differences that occurred would be the differences in pedagogy between discussion section instructors.

At the beginning of the semester, students received a first-week survey that contained the 16 items for the first academic self-efficacy survey. All but 218 of the enrolled students completed all the academic self-efficacy items. Then students continued with the course as usual. During the final week of the semester, students received an end-of-the-semester survey that contained the eight items from the second academic self-efficacy survey. Final grades consisted of chapter quizzes, writing essays, completing supplemental activities, attending discussion sections, a practice final exam, and official exams. The final letter grade was based on the number of points a student accumulated over the semester. The maximum number of points was 550. The average of final points was 487.05 which corresponds to a B+.

## Results

### *Performance*

Two-hundred eighteen students did not complete all the survey items (across both survey administrations), so they were removed from the analysis. Academic self-efficacy scores were computed using the average of the eight or 16 items in the survey. One-way ANOVA analyses were conducted to test if there were group differences in final points and academic self-efficacy

scores among class modes. Then correlations and regression lines were computed to explore how well academic self-efficacy scores predicted performance (final points).

Analyses showed that there was not a significant effect of class mode on final points, $F(2, 911) = 0.513$, $p = 0.599$. Thus, participants' final points were relatively constant when in the in-person/traditional ($M = 488.53$, $SD = 51.04$), hybrid ($M = 489.91$, $SD = 52.02$) or online class ($M = 476.04$, $SD = 60.04$). The graph in Figure 1 illustrates the similarity in scores across conditions. In addition, analyses failed to find a significant difference between class mode and academic self-efficacy scores for the first administration, $F(2, 911) = 1.686$, $p = 0.186$. Participants' level of academic self-efficacy were relatively constant at the beginning of the semester when in the in-person/traditional ($M = 5.13$, $SD = 0.79$), hybrid ($M = 5.20$, $SD = 0.84$) or online class ($M = 5.29$, $SD = 0.86$; see Figure 2).

Next, correlations and regression lines were computed to determine whether academic self-efficacy predicted final points and if those correlations differed between class modes. Results indicated that final points were significantly correlated with academic self-efficacy (measured at the beginning of the semester), $r(912) = 0.165$, $p < 0.001$. From the scatterplot (see Figure 3), it can be seen that the relationship was positive.

Correlations between academic self-efficacy and final points were computed for each course mode then compared using Fisher's Z transformation. Results indicated that final points were not significantly correlated with academic self-efficacy in the hybrid class, $r(247) = 0.070$, $p = 0.270$. From the scatterplot (see Figure 4), it can be seen that the relationship was somewhat positive. For the online class, final points were significantly correlated with academic self-efficacy in the hybrid class, $r(134) = 0.242$, $p = 0.005$. The relationship was positive (see Figure 5). For the in-person class, final points were significantly correlated with academic self-efficacy

in the hybrid class, $r(527) = 0.197$, $p < 0.001$. The relationship was, again, positive (see Figure 6).

The Fisher's Z-statistic comparing the academic self-efficacy – final points correlations for the online and in-person classes was 0.433 with a 95 percent confidence interval (0.239, 0.627). For online and hybrid: $z = 1.623$, confidence interval = (1.408, 1.838). For in-person and hybrid correlations: $z = 1.717$, confidence interval = (1.562, 1.871). Because none of the Z-statistics or their confidence intervals contained +/- 1.96, none of the correlations were significantly different from each other at the 95 percent confidence level.

According to Gore Jr. (2006), academic self-efficacy had a stronger correlation with GPA when measured at the end of the semester. Thus, this study re-measured academic self-efficacy at the end of the semester. A repeated measures *t*-test explored whether there was a change in self-efficacy from the beginning to the end of the semester. Analyses showed that participants had significantly higher academic self-efficacy scores at the end of the semester ($M = 5.35$, $SD = 1.19$) than at the beginning of the semester ($M = 5.18$, $SD = 0.81$), $t(913) = 4.858$, $p < 0.001$. However, when comparing the average scores on the same eight items from the first to second administration, there are not significant changes in scores ($M = 5.32$, $SD = 0.98$), $t(913) = 0.919$, $p = 0.358$. In addition, the correlations between the academic self-efficacy scores from the beginning of the semester (which will now be referred to as SE1) and final points and the correlation between academic self-efficacy scores from the end of the semester (now referred to as SE2) and finals points ($r(912) = 0.516$, $p < 0.001$), differed ($z = -8.631$, confidence interval = (-8.725, -8.538)). See Figure 7 for the scatterplot between SE2 and final points.

Next, the correlations between SE2 and final points were compared across class modes. The following *z*-scores are comparing the correlations between SE1-final points and SE2-final

points for each section. For the hybrid section, $z$ = -4.598, confidence interval = (-4.778, -4.418). For the online section, $z$ = -1.957, confidence interval = (-2.202, -1.711). And for the in-person section, $z$ = -7.213, confidence interval = (-7.337, -7.090). The hybrid and in-person sections had significant differences in correlation from SE1 to SE2, but the online section was just short of finding significance. Analyses showed that there was not a significant effect of class mode on SE2, $F(2, 911) = 0.655$, $p = 0.520$. Thus, participants' level of final points were relatively constant when in the in-person/traditional ($M$ = 5.33, $SD$ = 1.28), hybrid ($M$ = 5.46, $SD$ = 1.05) or online class ($M$ = 5.24, $SD$ = 1.34; see Figure 8).

*Scale Reliability*

The reliabilities of the academic self-efficacy scales were analyzed using coefficient alpha. For SE1 (16 items, $M$ = 5.20, $SD$ = 0.81), $\alpha$ = 0.92. For the eight-item academic self-efficacy survey given at the end of the semester (SE2), $\alpha$ = 0.94 ($M$ = 5.40, $SD$ = 1.20). So, alpha increased slightly from the first to second survey. If we only look at the eight items in the first survey that were on both questionnaires, $\alpha$ = 0.94 ($M$ = 5.30, $SD$ = 0.98). Thus, the reliability of these eight items did not change from the first to second administration. In addition, a repeated measures $t$-test was conducted to determine whether scores on those eight items differed from the first to second administration. Again, the $t$-test found that there was not a significant change in scores from the first to second administration. Lastly, there was a significant positive correlation between the items from SE2 and SE1, $r(912) = 0.423$, $p < 0.001$.

## Discussion

*Performance*

To begin, there were not any differences in academic self-efficacy scores between the in-person, online, and hybrid sections. This assures us that there were not pre-existing differences between the class sections and that the groups were equal before analysis began. It also suggests that any differences that existed between correlations would have been due to the interaction of class section and self-efficacy. There, also, were not any differences in final points between class sections, which is promising from an instructor's point of view, because the class mode is not affecting student performance.

There was a significant correlation between academic self-efficacy and class performance (final points) which aligns with findings in the literature (Bandura, 1995; Chemers et al., 2001; Zimmerman et al., 1992). The more academic self-efficacy a student has, the better they typically perform in the class. What was interesting, however, was that academic self-efficacy measured at the end of the semester (SE2) had a significantly larger correlation than at the beginning. These results agree with the conclusions made by Gore Jr. (2006). He found that college self-efficacy did not account for much variance in GPA, but self-efficacy measured at the end of the semester had a stronger relationship to class performance. From the data, it appears that academic self-efficacy measured at the end of the semester predicted class performance significantly better.

This should be expected because at the time the students answered the second self-efficacy survey, they were days away from receiving their final grade. So, they most likely had a good sense of how well they would do in the class. In addition, the items in the second self-efficacy survey focused more on the class material rather than college as a whole. Of course, students would feel more confident about the class material after having just learned it all. Even though Bandura (1995) suggested measuring self-efficacy before performing the tasks studied to get a predictive relationship, Multon et al. (1991) concluded that self-efficacy is a better

predictor when the measure closely follows the criterion measure. The results of the current study agree with Multon et al. (1991) and show that self-efficacy is a better indicator of performance when performance and efficacy are measured close together rather than measuring performance at some point in the future.

The main hypothesis of this paper, that the relationship between academic self-efficacy and class performance differs depending on the mode in which a class is taken, was not supported. Even though the correlation between SE1 and final points for the hybrid class was low and insignificant ($r = 0.070$) the Fisher's Z-statistics did not find it to be significantly different from either of the correlations for online and in-person sections. Thus, the format of the class does not affect the way academic self-efficacy plays into a student's performance. From an instructor's point of view, this is ideal because they want each student to have the same opportunity for success in the course, regardless of how a class is taken. It would be unfair to for students to be at a disadvantage just because they took the "wrong" section of a class. While the section of a class taken is usually self-selective, sometimes a student is forced into certain sections due to uncontrollable circumstances (e.g., classes filling up, scheduling conflicts).

In theory, there might be inherent differences in students who self-select themselves into different modes of a class that could lead to differences in outcomes. For example, Artino and McCoach (2008) found that self-regulatory traits are related to self-efficacy. Online classes typically require more self-regulatory behaviors because learning is more independent and less controlled by an instructor (compared to a traditional class setting). This could suggest that students who take online classes have more self-regulatory behaviors and, therefore, higher self-efficacy. However, that study did not look at the effect on class performance. Similarly, lack of motivation and time management can hurt performance in an online class (Kauffman, 2015) and

self-efficacy has been found to increase motivation (Robbins et al., 2004). A student with low motivation (and low academic self-efficacy) may not choose to take an online class, which could cause differences in groups. Although, there were no significant differences in academic self-efficacy between sections, so bias due to pre-existing characteristics was not an issue for the current study. Either way, no differences were found in academic self-efficacy's prediction of final grades from section to section.

It should be noted that there did appear to be ceiling effects in the data (see Figures 3-7). The maximum number of final points a student could receive was 550 and it appears that many students achieved that or near that score which makes the scatterplot level off at around this value. As a result, the trend may not be linear and the correlations may have been underestimated. However, scatterplots of the residuals still to suggest a linear relationship best fits the data.

There are a few other limitations to this research. First, as mentioned earlier, students more or less self-select into the different sections. As a consequence, results may be skewed due to lack of randomization. There could be underlying differences between groups, not noticed in the analysis, affecting results. Future research should attempt to maintain this randomization if possible. Secondly, 218 students were removed from the analysis due to missing data in the self-efficacy questionnaire. That is a large number of students to remove from the analysis and there could be important information missing from these subjects. For example, there could be an underlying characteristic shared by all the student who failed to finish the questionnaire that may have changed the results of the analysis. However, there was still a sample size of 914, which is a respectable size. Lastly, because the evidence supports the notion that self-efficacy is context dependent, any results in self-efficacy studies may have poor generalizability to other settings.

Future research could address whether and how well results from these studies would uphold in new environments.

Future research on academic self-efficacy should explore alternative ways self-efficacy could affect learning procedures and outcomes. Self-efficacy is most likely related to personality and other traits that could affect class performance and the class mode a student opts to take. For example, students with more self-efficacy typically work harder to regulate their learning, meaning they take control of their learning by studying and asking for help (Zimmerman & Martinez-Pons, 1990). As a result, they may significantly outperform low-efficacy students in an online learning environment where self-regulation is more important. Whereas in a traditional learning environment with more instructor aid, the difference between performance would not be as great.

*Scale Reliability*

According to the analyses, the reliability of the academic self-efficacy scale improved when fewer items were administered. These results are interesting because more items usually result in higher reliability. One explanation for this is that coefficient alpha is a measure of internal reliability. In SE1, eight items came from a survey that focused more on overall college performance and the other eight items focused on class material. The two contexts are a part of academic self-efficacy but are not exactly the same; thus, using only the eight items that were class-specific would lead to a higher reliability. Furthermore, as the literature states, self-efficacy is best measured when it is domain specific (Bandura, 2006; Joo et al., 2000; Multon et al., 1991), so having a greater reliability for the survey that honed in on class performance seems logical.

Additionally, there is test-retest reliability because scores on the eight items did not significantly differ from SE1 to SE2. On top of that, there was a strong positive correlation between scores from time 1 to time 2. Thus, this shorter academic self-efficacy scale appears to be a reliable measure of self-efficacy. This is beneficial because it is more convenient and efficient to administer a scale that is eight items rather than 16. If we can get a sense of one's academic self-efficacy in fewer items, this makes measurement much easier.

On interesting thing to note is that even though the reliability and average scores did not change much from the short version of SE1 to SE2, SE2 still was a better predictor of performance. The correlation between the short form of SE1 and final points was only $r(912) = 0.132$, $p < 0.001$. This seems low considering the same eight items had a much larger correlation when measured at the end of the semester. One explanation is that students got better at judging their academic self-efficacy for the class at the end of the semester. The average scores did not change significantly, but their estimations of ability were more accurate at the end of the semester, after completing most of the coursework. Future research should explore more reliable ways to measure self-efficacy. If shorter forms are just as reliable as longer versions, then those would be ideal for administration. In addition, research should focus on the most effective uses of said measures. From the current study and Multon et al. (1991), measures of self-efficacy are most useful when measured essentially simultaneously to the criterion measure, so how should we be using and interpreting these measures?

*Conclusion*

Self-efficacy is an important topic and should continue to be studied because it is a strong indicator of academic performance. Bandura (1995) stated that academic self-efficacy was a better predictor of performance than academic anxiety and concluded that instructors should

promote academic self-efficacy in their students rather than trying to treat academic anxiety. Margolis and McCabe (2006) offer suggestions to instructors on how to increase academic self-efficacy in their students. Some tips are not easily applicable to an undergraduate course of over 900 students, but others could be useful in this context. They stressed the importance of assigning moderately difficult tasks/assignments. Students should be challenged so they get experience working hard and overcoming difficulties, but not too challenged that they become overwhelmed and give up. Secondly, Margolis and McCabe (2006) suggested using peer models. If students can see their peers that are like themselves succeeding, they will be better able to picture themselves succeeding as well. This could mean bringing in past students to give study tips to the class or having students work in groups. In addition, they recommend teaching students specific learning strategies. This may not be practical in a large class, but instructors could provide a list of various study tips or additional resources to accommodate different learning styles. Lastly, they suggest capitalizing on student choice and interest. When students are given freedom to choose within a classroom, this can help improve their self-efficacy. Instructors could offer multiple options for class projects or paper topics, so students can choose a method that works best for them. Furthermore, the material should be novel and relevant to capture the student's interest. Margolis and McCabe (2006) also offer suggestions to instructors working one-on-one with students. In a large university-setting this may not be feasible, but worth checking out if applicable.

Even though significant results were not found in this study when comparing class modes, self-efficacy was still found to be a strong predictor of student performance. In conclusion, academic self-efficacy has important implications on student success and can be

improved with practical teaching strategies. Thus, self-efficacy should not be forgotten in the classroom and is a useful tool to promote student learning success.

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# Appendix A

Academic self-efficacy survey items administered to students during the first week of the semester

Rate on Likert Scale from 1 (very untrue) to 7 (very true)

1. I know how to schedule my time to accomplish my tasks.
2. I know how to take notes.
3. I know how to study to perform well on tests.
4. I am good at research and writing papers.
5. I am a very good student.
6. I usually do very well in school and at academic tasks.
7. I find my academic work interesting and absorbing.
8. I am very capable of succeeding at this college.
9. I believe I will receive an excellent grade in this class
10. I'm certain I can understand the most difficult material presented in the readings for this course
11. I'm confident I can learn the basic concepts taught in this course.
12. I'm confident I can understand the most complex material presented by the instructor in this course
13. I'm confident I can do an excellent job on the assignments in this course.
14. I expect to do well in this class
15. I'm certain I can master the skills being taught in this class
16. Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class

# Appendix B

Academic self-efficacy survey items administered to students during the last week of the semester

Rate on Likert Scale from 1 (very untrue) to 7 (very true)

1. I believe I will receive an excellent grade in this class.
2. I'm certain I can understand the most difficult material presented in the readings for this course.
3. I'm confident I can learn the basic concepts taught in this course.
4. I'm confident I can understand the most complex material presented by the instructor in this course.
5. I'm confident I can do an excellent job on the assignments in this course.
6. I expect to do well in this class.
7. I'm certain I can master the skills being taught in this class.
8. Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class.

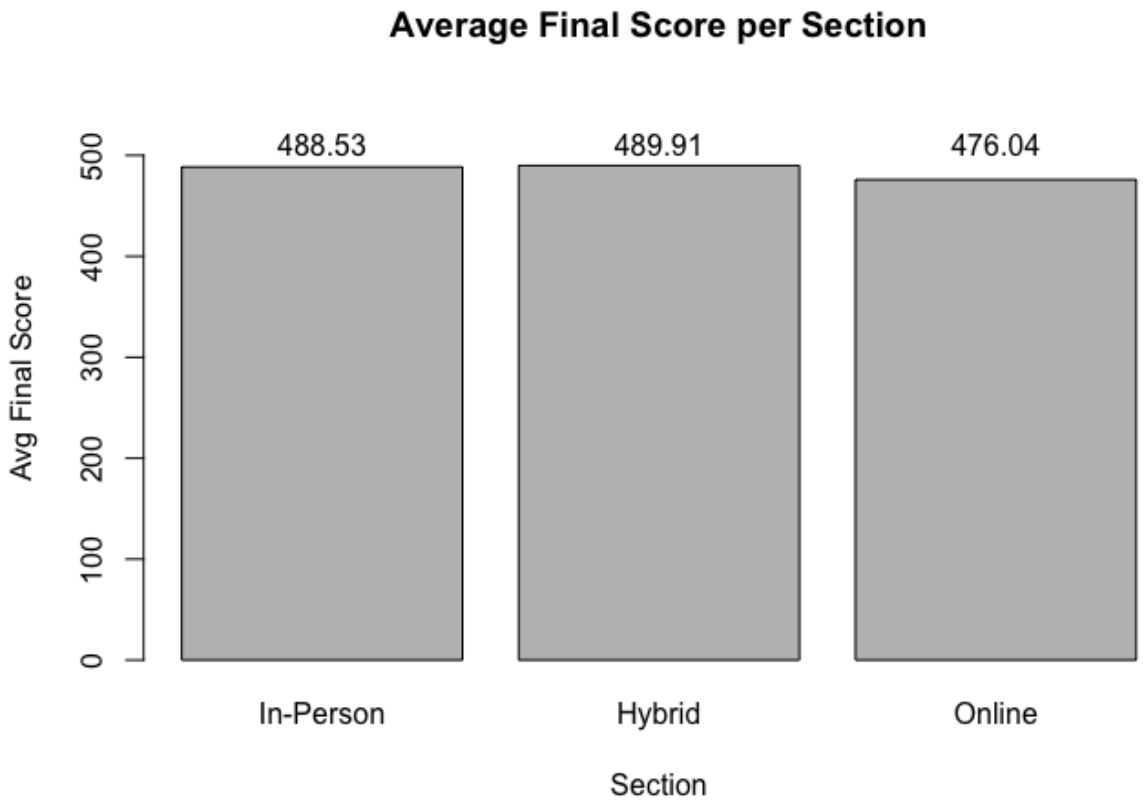


*Figure 1*. Bar graph summarizing the average final points for each section.

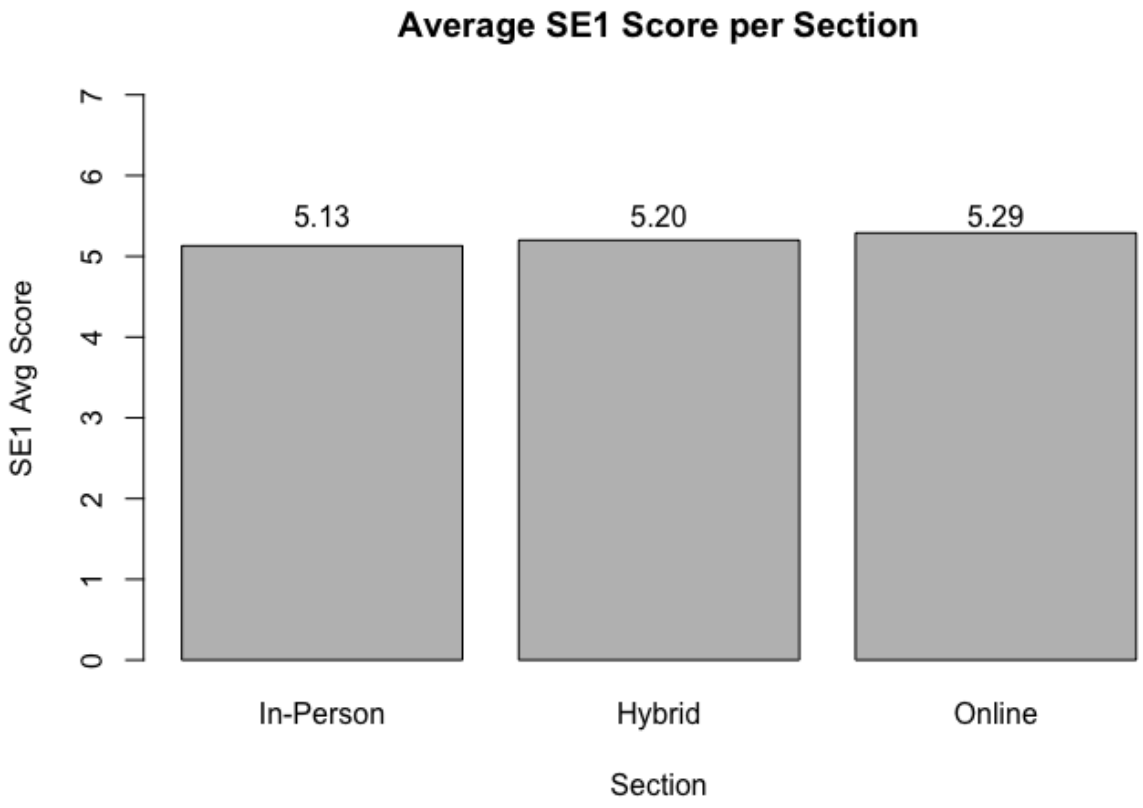


*Figure 2.* Bar graph summarizing the average academic self-efficacy score for the first survey containing 16 items (SE1).

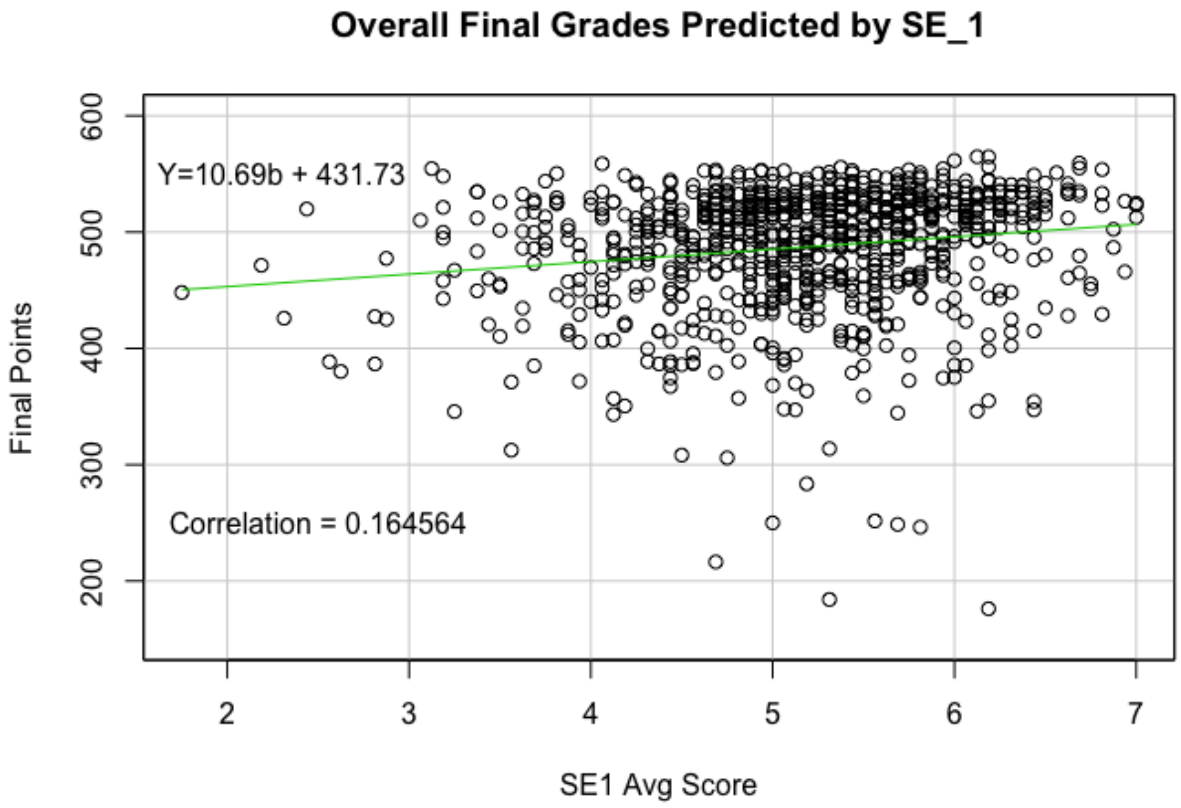


*Figure 3.* Scatterplot graphing the overall average final points onto academic self-efficacy scores for the first survey. The correlation and regression line are printed on the graph.

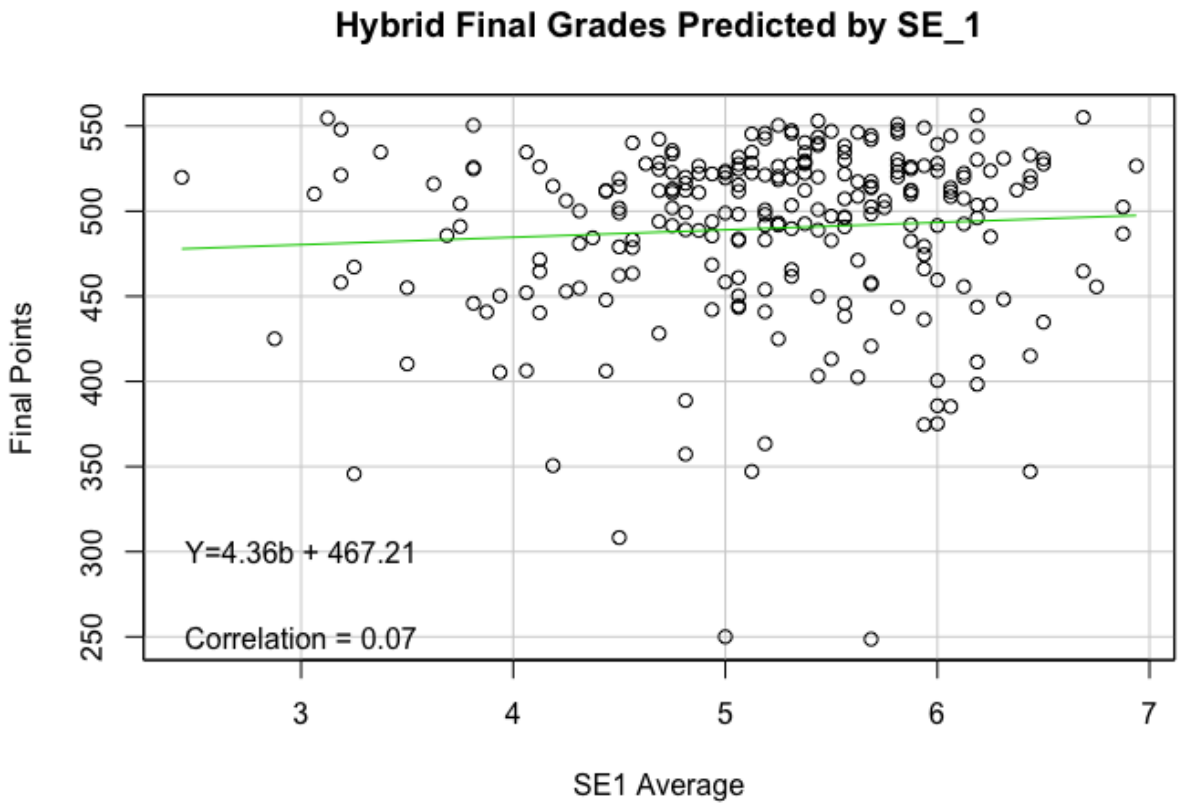


*Figure 4.* Scatterplot graphing the hybrid section's average final points onto academic self-efficacy scores for the first survey. The correlation and regression line are printed on the graph.

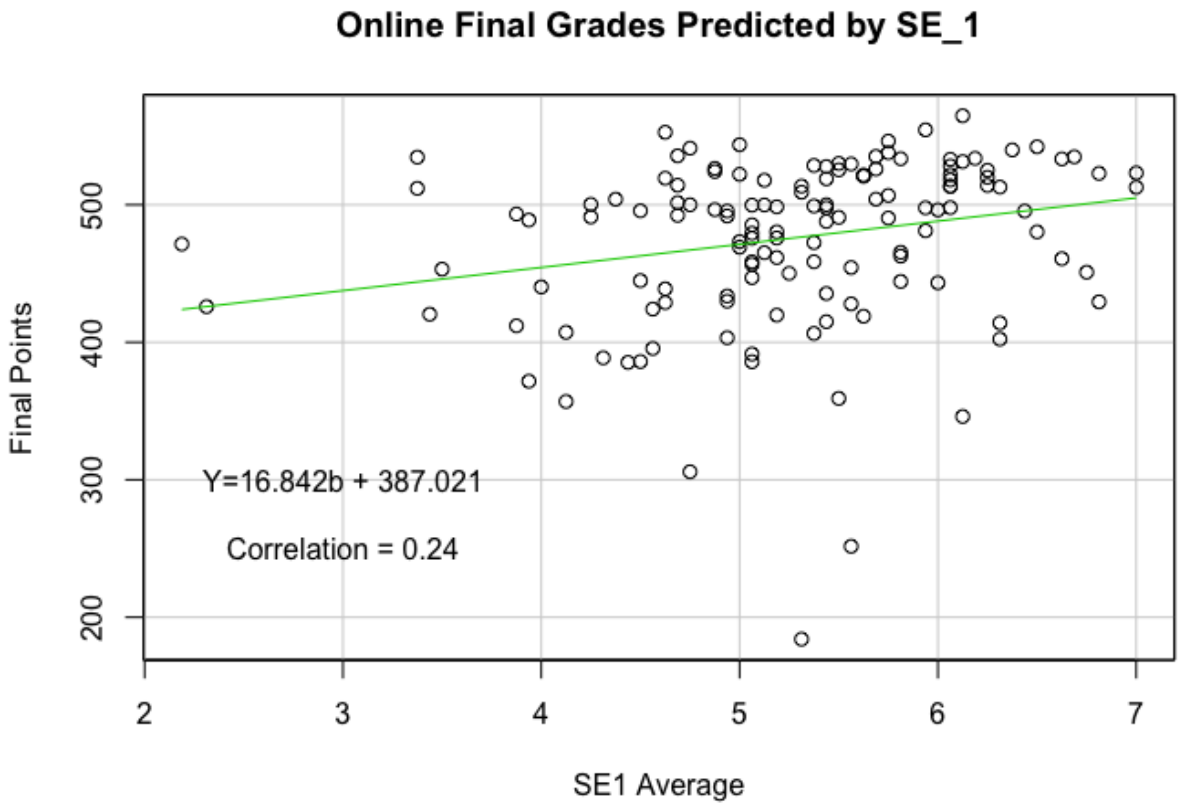


*Figure 5.* Scatterplot graphing the online section's average final points onto academic self-efficacy scores for the first survey. The correlation and regression line are printed on the graph.

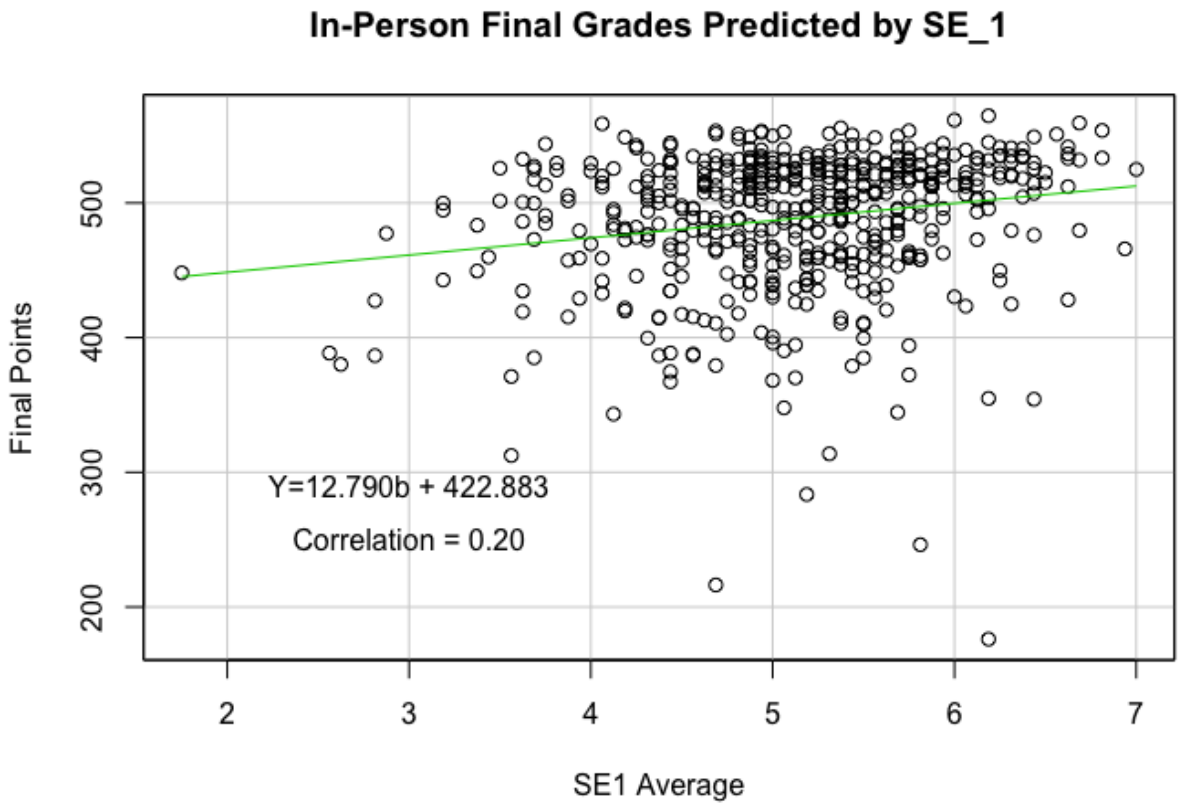


*Figure 6.* Scatterplot graphing the in-person section's average final points onto academic self-efficacy scores for the first survey. The correlation and regression line are printed on the graph.

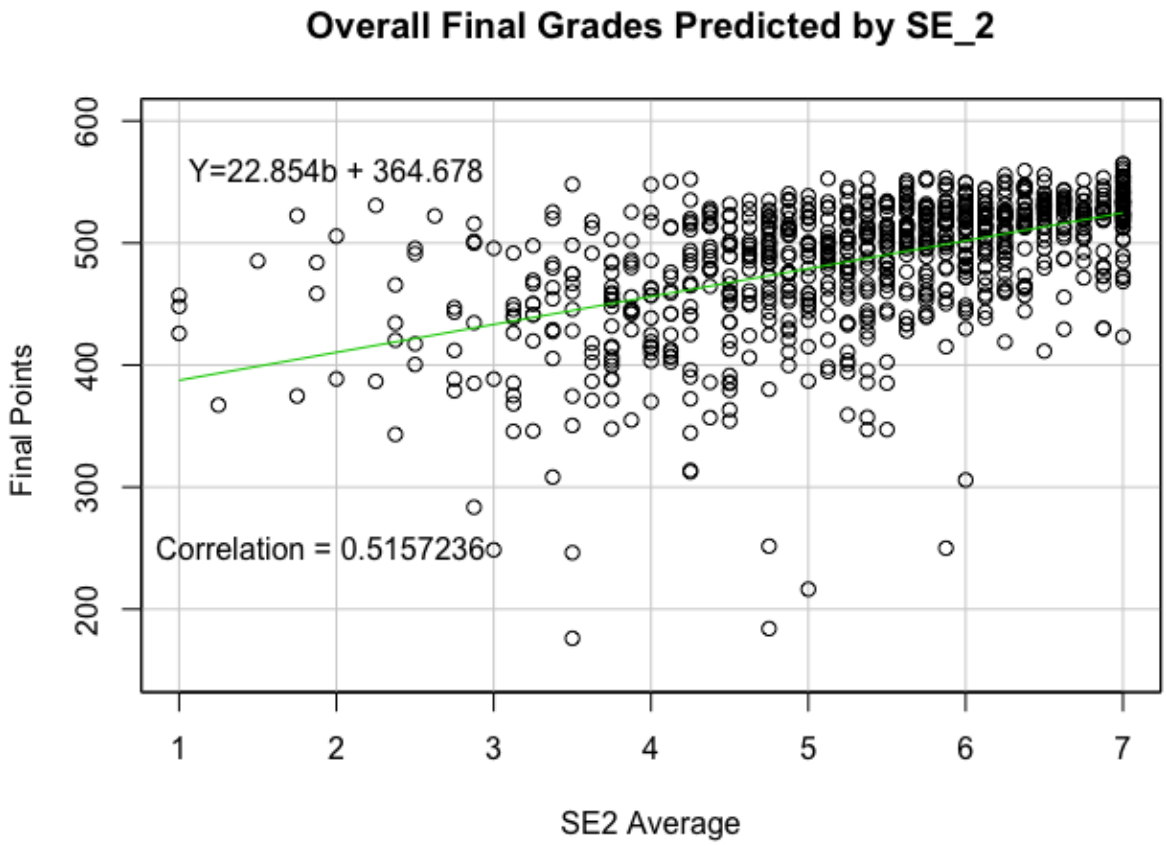


*Figure 7.* Scatterplot graphing the overall average final points onto academic self-efficacy scores for the second survey (SE2). The correlation and regression line are printed on the graph.

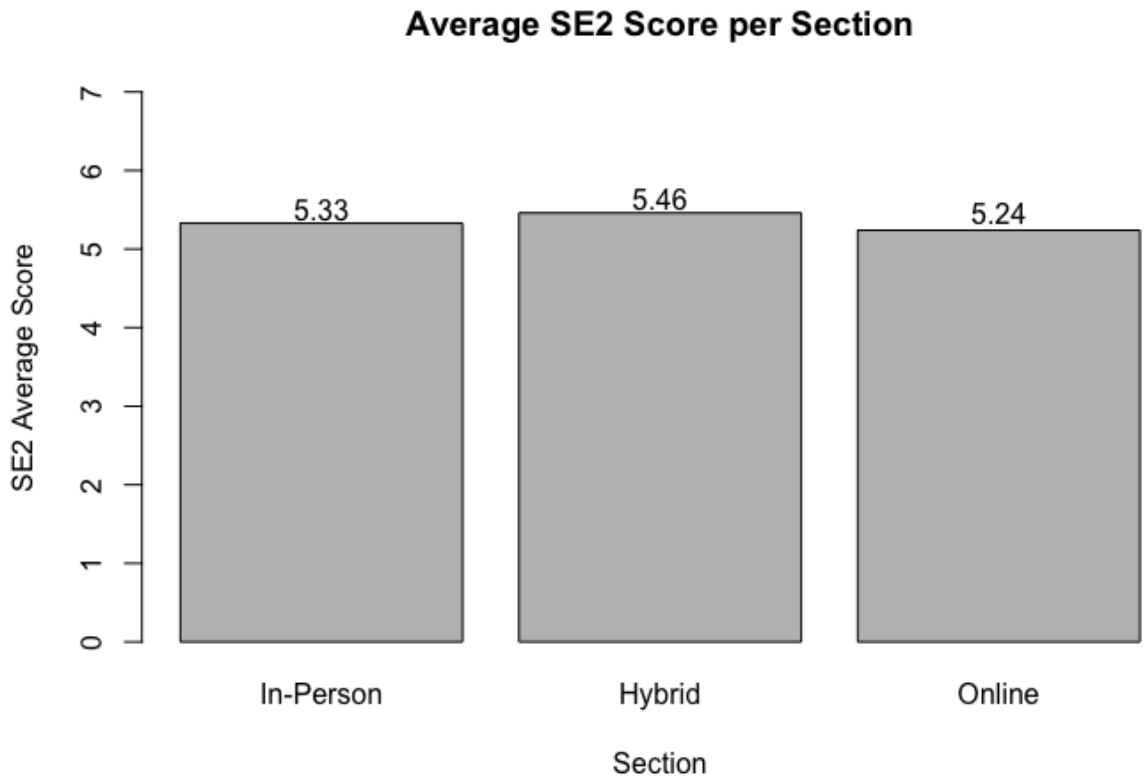


*Figure 8.* Bar graph summarizing the average academic self-efficacy score for the second survey containing eight items (SE2).